

FISHERY DATA SERIES NO. 49

EFFORT AND CATCH STATISTICS
FOR THE SPORT FISHERY
IN THE NAKNEK RIVER, 1987¹

By

R. Eric Minard
and
Thomas E. Brookover III

Alaska Department of Fish and Game
Division of Sport Fish
Juneau, Alaska 99802

April 1988
Reprinted June 1990

¹ This investigation was partially financed by the Federal Aid in Sport Fish Restoration Act (16 U.S.C. 777-777K) under Project F-10-3, Job No. S-5-1.

The Alaska Department of Fish and Game operates all of its public programs and activities free from discrimination on the basis of race, color, national origin, age, sex, or handicap. Because the department receives federal funding, any person who believes he or she has been discriminated against should write to:

O.E.O.
U.S. Department of the Interior
Washington, D.C. 20240

TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES.....	ii
LIST OF FIGURES.....	iv
LIST OF APPENDIX TABLES.....	v
ABSTRACT.....	1
INTRODUCTION.....	2
METHODS.....	2
Creel Survey.....	2
Study Design.....	2
Data Collection.....	4
Data Analyses.....	5
Escapement.....	8
RESULTS.....	8
Effort.....	8
Catch and Harvest Rate.....	10
Catch and Harvest.....	10
Efficiency of Gear Types.....	10
Angler Preferences Regarding Regulatory Changes.....	17
Escapement.....	17
Size, Sex, and Age Compositions.....	17
DISCUSSION.....	17
Historical Performance.....	17
LITERATURE CITED.....	29
APPENDIX TABLES.....	31

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Estimated effort (angler-hours) by location and temporal component for the lower Naknek River, 1987....	9
2. Estimated catch and harvest rates (fish per angler-hour) by species and temporal component for the sport fishery in the lower Naknek River, 1987.....	11
3. Estimated catch and harvest rates (fish per angler-hour) by species and temporal component for the sport fishery in the upper Naknek River, 1987.....	12
4. Estimated catch and harvest, by species, for the sport fishery in the lower Naknek River, 1987.....	13
5. Estimated catch and harvest, by species, for the sport fishery in the upper Naknek River, 1987.....	14
6. Catch and harvest, by species, for the sport fishery in the lower and upper sections of the Naknek River, 1987.....	15
7. Catch and harvest rates (fish per angler-hour) of chinook salmon by guided and unguided anglers in the sport fishery in the lower Naknek River, 1987.....	16
8. Catch and harvest rates (fish per angler-hour) of chinook salmon by artificial lures and bait in the lower Naknek River, 1987.....	18
9. Responses of anglers regarding proposed regulatory options for the sport fishery for chinook salmon in the Naknek River, 1987.....	19
10. Estimates of chinook salmon escapement from aerial surveys in the Naknek River drainage, 1987.....	20
11. Numbers, mean lengths (mm), weights (kg) of chinook salmon, by sex and age group, sampled from the sport fishery in the Naknek River, 1987.....	21
12. Sex and age compositions and mean lengths (mm) of chinook salmon sampled from the escapement to Big Creek, King Salmon Creek, and Paul's Creek, 1987.....	22
13. Sex and age compositions and mean lengths (mm) and weights (kg) of rainbow trout sampled from the sport harvest in the Naknek River, 1987.....	23

LIST OF TABLES (Continued)

<u>Table</u>	<u>Page</u>
14. Harvests and escapements of chinook salmon returns to the Naknek River, 1967-1987.....	25
15. Harvests of coho salmon, rainbow trout, and Dolly Varden by the sport fishery in the Naknek River, 1977-1987.....	27
16. Effort, harvest, catch, and catch rate statistics for anglers fishing the upper Naknek River during the period 15 August through 15 October, 1978, 1981, 1983, 1984, and 1987. Length statistics of harvested rainbow trout during these years are also presented....	28

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. The Naknek River study site.....	3
2. Naknek River chinook salmon sport harvest, 1967-1987...	24

LIST OF APPENDIX TABLES

<u>Appendix Table</u>	<u>Page</u>
1. Angler counts for the sport fishery in the lower Naknek River, 1987.....	32
2. Angler counts for the sport fishery in the upper Naknek River, 1987.....	35
3. Summary of daily angler effort and catch rates (CPUE) for chinook and coho salmon, rainbow trout, Dolly Varden, and Arctic grayling from angler interviews in the sport fishery in the lower Naknek River, 1987.....	40
4. Summary of daily angler effort and harvest rates (CPUE) for chinook and coho salmon, rainbow trout, Dolly Varden, and Arctic grayling from angler interviews in the sport fishery in the lower Naknek River, 1987...	42
5. Summary of daily angler effort and catch rates (CPUE) for sockeye and coho salmon, rainbow trout, Dolly Varden, and Arctic grayling from angler interviews in the sport fishery in the upper Naknek River, 1987.....	44
6. Summary of daily angler effort and harvest rates (CPUE) for sockeye and coho salmon, rainbow trout, Dolly Varden, and Arctic grayling from angler interviews in the sport fishery in the upper Naknek River, 1987.....	46

ABSTRACT

An estimated 70,373 angler-hours of effort were expended by recreational anglers fishing the Naknek River from 1 June through 30 October 1987. Anglers caught (landed) and harvested (kept) an estimated 14,250 and 11,419 chinook salmon *Oncorhynchus tshawytscha*, 2,292 and 2,187 coho salmon *Oncorhynchus kisutch*, and 7,657 and 1,169 rainbow trout *Salmo gairdneri*. Age 1.4 chinook salmon (53 percent) and age 5 rainbow trout (40 percent) dominated the harvest. Anglers using bait out-fished those using artificial lures nearly 2 to 1 when fishing for chinook salmon in the lower river. The spawning escapement of chinook salmon, as determined by aerial survey counts of live fish expanded for missed areas, was estimated to be 6,500 fish. The age composition of the escapement closely approximated that of the sport harvest.

KEY WORDS: chinook salmon, *Oncorhynchus tshawytscha*, sockeye salmon, *Oncorhynchus nerka*, coho salmon, *Oncorhynchus kisutch*, and rainbow trout, *Salmo gairdneri*, sport harvest, sport effort, creel survey, escapement, Naknek River.

INTRODUCTION

The recreational fishery on the Naknek River (Figure 1) is the largest and fastest growing sport fishery in both effort and harvest in Bristol Bay (Mills 1987). Historically, the fishery targets chinook *Oncorhynchus tshawytscha*, sockeye *O. nerka*, and coho salmon *O. kisutch* during the early part of the season. Later in the season the fishery targets resident fish, particularly rainbow trout *Salmo gairdneri*.

The Alaska Department of Fish and Game (ADF&G), Sport Fish Division, initiated a creel survey of the sport fishery for chinook salmon in 1986 (Minard 1987). The survey was expanded in 1987 to include the fisheries for other anadromous and resident species and is used to estimate sport fishing effort, catch (fish landed), and harvest (fish retained) and the age, sex, and size compositions of the harvest. Surveys of the sport fishery for chinook salmon in the Naknek River were most recently conducted in 1975, 1978, and 1979 (Gwartney 1976, 1979, 1980). Surveys of the sport fishery for rainbow trout in the Naknek River were most recently conducted in 1978, 1981, 1983, and 1984 (Gwartney 1985).

METHODS

Creel Survey

Anglers fishing the Naknek River during 1987 were permitted a daily bag limit of 10 fish of any species (ADF&G 1987). Within this daily bag limit, five could be chinook salmon, only two of which could be greater than 71 cm (28 in), five could be other salmon (sockeye, chum, coho, or pink) with no size limit, and two could be rainbow trout, only one of which could be greater than 51 cm (20 in). A no-bait restriction was in effect from the Old Katmai National Park Boundary upstream to Naknek Lake. No fishing above the ADF&G markers at Rapids Camp was allowed from 10 April through 7 June, to protect spawning rainbow trout.

Study Design:

The creel survey was conducted in two distinct geographic areas of the river. The upper area starts at the outlet of Naknek Lake and extends downstream 19.3 km (Figure 1). Anglers fishing this area primarily target rainbow trout, Dolly Varden *Salvelinus malma*, and Arctic grayling *Thymallus arcticus*. The lower survey area extends from the downstream boundary of the upper study area to a point 12.9 km downstream of Smelt Creek. Anglers fishing in this area primarily target salmon.

Roving creel surveys (Neuhold and Lu 1957) using a stratified, random sampling design were used to count anglers, conduct angler interviews, and sample the sport harvest in each study area. Angler counts were used to estimate fishing effort in units of angler-hours. Angler interviews provided estimates of catch rates (fish per angler-hour).

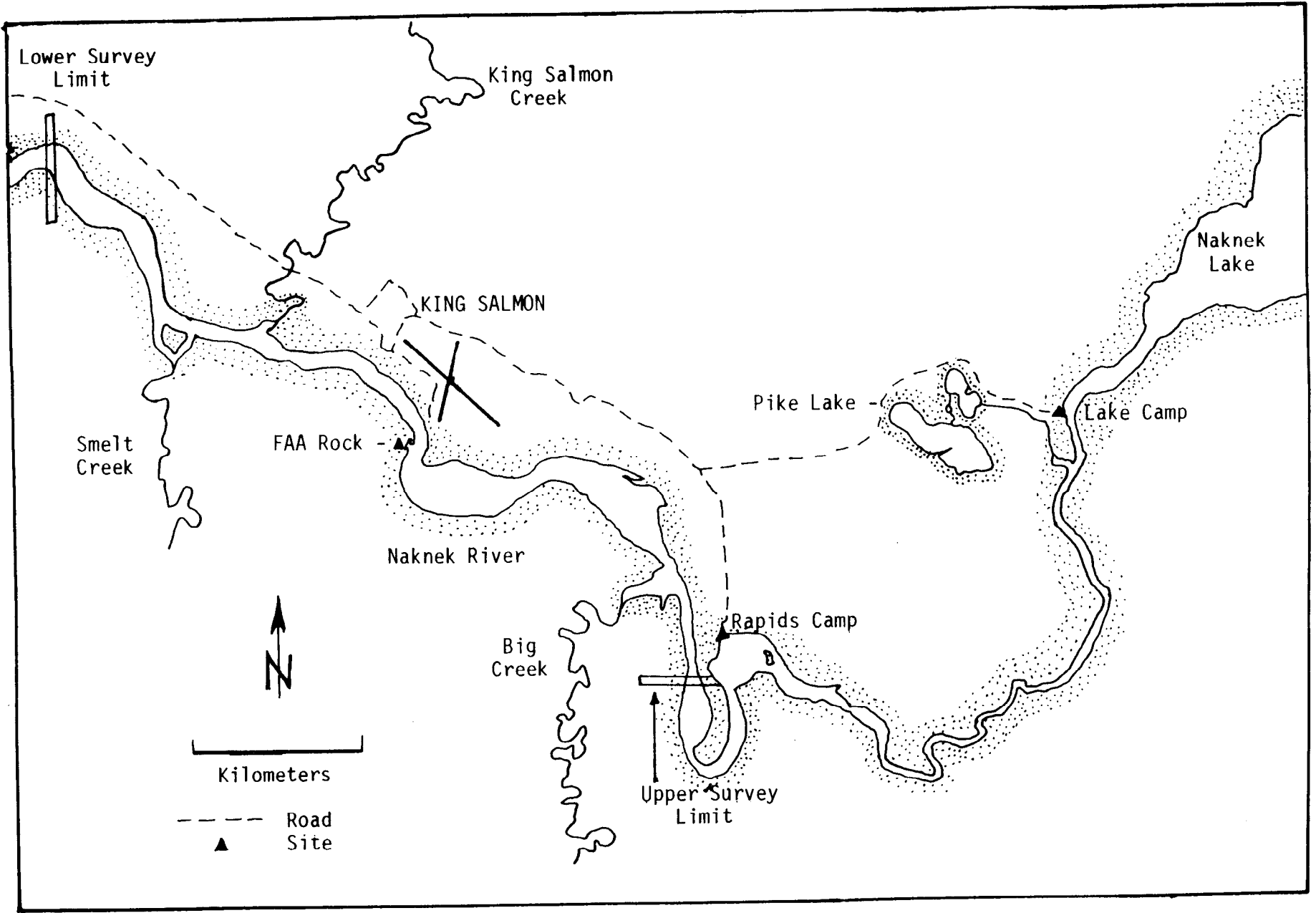


Figure 1. The Naknek River study site.

The fishery in the lower survey area primarily targets chinook salmon. Chinook salmon first enter the Naknek River during early and mid-June and the majority of the run typically migrates through the lower section of river during a 4-week period. Coho salmon first enter the river in mid-July and continue to be caught by anglers through September. To reflect changes in salmon abundance, the study period (1 June through 13 September) in the lower survey area was subjectively stratified into four temporal components: (1) 1 June through 21 June; (2) 22 June through 21 July; (3) 22 July through 10 August; and, (4) 11 August through 13 September. The fishing day was defined as 18 hours in duration (0600 to 2400 hrs) with each day being divided into three time strata: period A (0600-1159 hrs); period B (1200-1759 hrs); and period C (1800-2400 hrs).

The fishery in the upper survey area primarily targets rainbow trout and has a period of high angler effort in June, followed by a period of low effort through the summer, and followed by another period of high effort in the fall. Effort levels, thought to reflect seasonal availability of rainbow trout (Burger and Gwartney 1986), were used to define temporal components in the upper survey area. The survey was conducted from 8 June through 13 September and was divided into three temporal components: (1) 8 June through 14 June; (2) 15 June through 13 September; and (3) 14 September through 30 October. During the first and second temporal components, the angler day and daily time strata were the same as described for the lower river. During the third temporal component, the length of the angler day was decreased to 12 hours and each day was divided into three time strata: period A (0800-1159 hrs); period B (1200-1659 hrs), and period C (1700-2000 hrs).

In both survey areas, angler effort and catch and harvest were estimated separately for each temporal component. Shifts in sampling intensity between the upper and lower areas were intended to reflect seasonal changes in angling effort. Within each geographic strata, daily temporal strata were sampled with equal intensity. Specific temporal strata to be sampled were randomly selected without replacement from those available.

Data Collection:

In both survey areas, one angler count was conducted immediately prior to and after a randomly selected 4-hour survey period. To conduct an angler count, a boat was driven through the survey area at a near constant speed and all anglers that were actively fishing were counted. The angler count was completed within 40 to 60 minutes and was considered an instantaneous count (Neuhold and Lu 1957). It was not possible to differentiate between guided and unguided anglers.

Angler interviews were conducted during the remaining time between angler counts. Most anglers were interviewed as they exited the fishery (completed-trip interviews). Additionally, some anglers were interviewed while they were still fishing (incompleted-trip interviews). All interviews were of individual anglers. For each angler interviewed, the following information was recorded: the number of hours fished, the number of fish in the angler's possession by species, the number of fish released by species, whether the

angler was guided or not guided, the type of gear used (fly, spin, or bait), and the angler's state or country of residency.

During the interviews, anglers were also asked about their preference regarding management of the chinook salmon fishery. During the period 1 July through 14 July, anglers fishing the lower river were asked if they approved, disapproved, or had no opinion regarding: (1) the elimination of bait fishing, (2) the closure of the spawning grounds to chinook salmon fishing, (3) the reduction in bag and possession limits for chinook salmon, (4) the setting of a chinook salmon fishing season, and (5) the use of emergency order closures.

Harvested salmon encountered during the surveys were measured for mid-eye to fork-of-tail length, weighed, and sexed based on external characteristics. In addition, three scales were removed from the preferred area¹ and mounted on an adhesive-coated card. The fork length of all resident species was recorded to the nearest millimeter, and the weight to the nearest tenth of a kilogram. A scale smear from rainbow trout was taken from the preferred area and four scales per fish were later mounted on an adhesive-coated card.

Data Analyses:

The mean number of anglers per count was calculated for each period as:

$$\bar{X} = (1/H) \sum_{i=1}^L H_i \bar{x}_i \quad [1]$$

where:

L = the number of daily time strata, 3 or 4,
H = the total number of hours in a component, and
H_i = the total number of hours in stratum i.

\bar{X} = the mean number of anglers per count for a component,

\bar{x}_i = the mean number of anglers per count for stratum i.

The variance of the mean number of anglers per count was calculated as (Jessen 1978):

$$\hat{V}(\bar{X}) = (1/H^2) \sum_{i=1}^L H_i^2 [s_i^2/n_i] \quad [2]$$

where H and H_i are defined as above and:

1 The left side of the fish approximately two rows above the lateral line and on the diagonal row downward from the posterior insertion of the dorsal fin (Clutter and Whitesel 1956).

n_i = the total number of angler counts in stratum i , and

s_i^2 = the sample variance of \bar{x}_i for stratum i .

The total number of angler-hours (E_T) in each period was estimated as:

$$\hat{E}_T = H\bar{X} = \sum_{i=1}^L H_i \bar{x}_i \quad [3]$$

The variance for the estimate of total angler-hours was calculated as:

$$\hat{V}(E_T) = H^2 \hat{V}(\bar{X}) \quad [4]$$

The total number of angler-hours for the season was estimated by summing the estimates of total angler-hours for all temporal components. Because these are independent estimates, the variance is the sum of the individual variances.

Catch per unit effort (CPUE) for species j during a component was estimated as:

$$CPUE_i = \frac{\sum_{k=1}^m c_{jk}}{\sum_{k=1}^m f_k} \quad [5]$$

where:

- m = the number of anglers interviewed during the component,
- c_{jk} = the catch (either number harvested or caught) of species j by angler k , and
- f_k = the effort (number of hours) expended by angler k .

The variance of mean effort per angler was estimated using a two-stage sample design with days representing the first-stage sample units and anglers the second-stage sample units (Von Geldern and Tomlinson 1973). On a given sample day, the number of second-stage units available was unknown. Thus, the variance of mean effort was estimated as (Sukhatme et al. 1984):

$$V(\bar{f}) = [1 - (d/D)] s_B^2/d + \frac{D}{k=1} (\sum s_{wk}^2/m)/dD \quad [6]$$

where:

- d = the number of days sampled during the component,
- D = the number of days in the component,
- s_{wk}^2 = the sample variance of effort for anglers interviewed during day k ,
- s_B^2 = the between-day variance of angler effort, and,
- m_i = the number of anglers interviewed during day i .

The between-day variance, s_B^2 , was estimated as:

$$s_B^2 = \left[\sum_{k=1}^D (\bar{f}_k - \bar{f})^2 \right] / (d-1) \quad [7]$$

where \bar{f}_k = the mean effort by anglers interviewed during day k.

The variance of $CPUE_j$ was calculated using the approximation for the variance of the quotient of two random variables (Jessen 1978):

$$\hat{V}(CPUE_j) = (\bar{c}_j / \bar{f})^2 (s_c^2 / \bar{c}^2 + s_f^2 / \bar{f}^2 - 2rs_c s_f / \bar{c}\bar{f}) \quad [8]$$

where:

\bar{c}_j = the mean catch of species i by anglers interviewed during a period,

\bar{f} = the mean number of hours fished by anglers interviewed during a component,

s_c^2 = the two-stage variance estimate of \bar{c}_j ,

s_f^2 = the two-stage variance estimate for \bar{f} , and

r = the correlation between the c_{jk} and f_k .

The catch or harvest of species j was estimated by:

$$C_j = E_T CPUE_j \quad [9]$$

The variance of the catch was estimated using Goodman's (1960) formula for the variance of the product of two independent random variables:

$$\hat{V}(C_j) = [E_T^2 V(CPUE_j)] + [CPUE_j^2 V(E_T)] - [V(E_T) V(CPUE_j)] \quad [10]$$

Total catch and its variance were estimated for each component and summed to estimate the total season catch. The same procedures were followed in estimating total harvest of each species.

The assumptions necessary for these analyses were:

1. Incompleted-trip angler interviews provide an unbiased estimate of completed-trip angler CPUE.
2. Interviewed anglers are representative of the total angler population and anglers were interviewed in proportion to their abundance on the day of the interview.
3. No significant fishing effort occurred between 2400 hours and 0600 hours.

4. Effort, catch, and harvest are normally distributed random variables.
5. Catch rate and duration of fishing trip are independent (DiConstanzo 1956).

The age compositions of harvested chinook salmon and rainbow trout were estimated from scales collected during the creel survey. In addition, the proportional age compositions of the harvest were estimated where sample sizes allowed. Letting p_h be the estimated proportion of age group h , the variance of p_h was estimated using the normal approximation to the binomial (Schaeffer et al. 1979):

$$V(\hat{p}_h) = \hat{p}_h(1-\hat{p}_h)/(n_T-1) \quad [11]$$

where n_T is the number of legible chinook salmon scales read.

Mean length at age by sex and their variances were estimated using standard procedures. Mean length (millimeter) and weight (kilogram) were calculated by age group for all chinook salmon sampled.

Escapement

The magnitude of the spawning escapement of chinook salmon to the Naknek River was estimated using aerial surveys conducted from fixed-wing aircraft of the four major spawning locations: Big Creek, Pauls Creek, King Salmon Creek, and the mainstem Naknek River. Only the peak (largest) count of live fish for each area was recorded. Counts were expanded for missed sections of the river under the untested assumption that spawner distribution for unsurveyed sections was similar to surveyed sections. No accounting was made for fish that had already spawned and left the system or fish that had not yet arrived.

Carcasses of spawned-out chinook salmon were sampled for age, sex, and length data as previously described. Mean length at age by sex and their variances were estimated using standard procedures. Mean length (millimeter) and weight (kilogram) were calculated by age group for all chinook salmon sampled.

RESULTS

The creel survey on the lower Naknek River was conducted from 1 June to 13 September. The survey on the upper section was conducted from 8 June to 30 October.

Effort

Mean angler counts on the lower section were 12.6, 71.3, 36.1, and 19.8 for temporal components one through four, respectively (Appendix Table 1 and Table 1). Total effort was estimated to be 59,932 angler-hours for this section with about 60% of the effort occurring during the second temporal component (22 June through 21 July).

Table 1. Estimated effort (angler-hours) by location and temporal component for the lower Naknek River, 1987.

Location and Component	Number of Interviews	Number of Days Possible	Number of Days Sampled	Anglers Per Count	Estimated Effort			
					Ang Hrs	SE ¹	95 % CI ²	Rel Pre ³
Lower Naknek River								
1 (6/01-6/21)	228	21	9	12.6	4,193	923	2,384 to 6,002	43.1%
2 (6/22-7/21)	924	30	20	71.3	35,839	2,931	30,094 to 41,584	16.0%
3 (7/22-8/10)	403	20	14	36.1	10,717	1,109	8,543 to 12,892	20.3%
4 (8/11-9/13)	143	34	11	19.8	9,183	2,009	5,244 to 13,121	42.9%
Season Total	1,698	105	54		59,932	3,868	52,415 to 67,450	12.5%
Upper Naknek River								
1 (6/08-6/14)	96	7	4	17.3	2,174	397	1,396 to 2,951	35.8%
2 (6/15-9/13)	111	91	17	5.4	6,292	895	4,539 to 8,046	27.9%
3 (9/14-10/13)	147	47	22	3.9	1,975	296	1,395 to 2,556	29.4%
Season Total	354	145	43		10,441	1,022	8,437 to 12,445	19.2%
¹ Standard Error. ² Confidence interval. ³ Relative precision of 95% confidence interval.								

Mean angler counts on the upper section were 17.3, 5.4, and 3.9, for components one through three, respectively (Table 1 and Appendix Table 2). Total effort in the upper section was estimated to be 10,441 angler-hours with just over 60% of the effort occurring during the second temporal component (15 June through 13 September).

Catch and Harvest Rate

Catch rates for chinook and coho salmon in the lower river study area peaked during components three and four, respectively (Appendix Table 3 and Table 2) whereas harvest rates peaked during components two and four, respectively (Appendix Table 4 and Table 2). Catch and harvest rates of other species (rainbow trout, Dolly Varden, and Arctic grayling) were generally small.

In the upper river study area, catch rates of rainbow trout were highest during temporal component three, averaging better than one fish per angler-hour (Appendix Table 5 and Table 3). Harvest rates of rainbow trout were similar during all three components (Appendix Table 6 and Table 3). Catch and harvest rates for other species were relatively small with the exception of sockeye salmon catches in the third temporal component.

Catch and Harvest

In the lower river study area, an estimated 14,250 chinook salmon were caught (landed) of which 11,419 (80%) were harvested (Table 4). Peak catches and harvests of chinook salmon occurred during the second temporal component. Nearly 2,100 coho salmon were caught of which 95% were harvested. Catches of rainbow trout totaled 1,222 with 41% being retained. Catches of Dolly Varden and Arctic grayling totaled 60 and 103 fish, respectively.

In the upper river study area, catches and harvests of rainbow trout totaled 6,435 and 672, respectively (Table 5). Nearly all the 975 sockeye salmon caught were released. All 193 coho salmon caught in this section were harvested. Of the 532 Arctic grayling caught, 33.5% or 178 were harvested.

Total (both study areas combined) catches and harvests for the most popular sport species were 14,250 and 11,419 chinook salmon, 2,292 and 2,187 coho salmon, and 7,657 and 1,169 rainbow trout, respectively (Table 6).

Although effort and catch for guided and unguided anglers could not be estimated separately, estimates of catch and harvest rates of chinook salmon were possible (Table 7). Daily catch rates of guided and unguided anglers were compared using a sign test (Conover 1980). No significant differences between catch and harvest rates of guided and unguided anglers were found ($\rho > 0.05$).

Efficiency of Gear Types

Daily catch and harvest rates of chinook salmon for anglers using artificial lures and bait were compared using a sign test (Conover 1980). Catch and harvest rates for anglers using bait were found to be approximately 0.30 and

Table 2. Estimated catch and harvest rates (fish per angler-hour) by species and temporal component for the sport fishery in the lower Naknek River, 1987.

	Temporal Component ¹	Catch		Harvest	
		Fish/Hr	SE ²	Fish/Hr	SE ²
Chinook	1	0.0666	0.0152	0.0666	0.0152
Salmon	2	0.2694	0.0167	0.2364	0.0140
	3	0.3308	0.0263	0.2137	0.0161
	4	0.0840	0.0232	0.0412	0.0125
Coho	1	0.0000	0.0000	0.0000	0.0000
Salmon	2	0.0000	0.0000	0.0000	0.0000
	3	0.0180	0.0197	0.0167	0.0196
	4	0.2076	0.0901	0.1977	0.0862
Rainbow	1	0.0242	0.0194	0.0120	0.0188
Trout	2	0.0200	0.0036	0.0072	0.0019
	3	0.0109	0.0030	0.0077	0.0025
	4	0.0313	0.0190	0.0115	0.0074
Dolly	1	0.0000	0.0000	0.0000	0.0000
Varden	2	0.0011	0.0004	0.0000	0.0000
	3	0.0006	0.0007	0.0000	0.0000
	4	0.0016	0.0021	0.0000	0.0000
Arctic	1	0.0030	0.0017	0.0030	0.0017
Grayling	2	0.0008	0.0009	0.0006	0.0008
	3	0.0000	0.0000	0.0000	0.0000
	4	0.0066	0.0113	0.0000	0.0000

¹ 1 - 6/01-6/21; 2 - 6/22-7/21;
3 - 7/22-8/10; 4 - 8/11-9/13.

² Standard Error.

Table 3. Estimated catch and harvest rates (fish per angler-hour) by species and temporal component for the sport fishery in the upper Naknek River, 1987.

Species	Temporal Component ¹	Catch		Harvest	
		Fish/Hr	SE ²	Fish/Hr	SE ²
Sockeye	1	0.0000	0.0000	0.0000	0.0000
Salmon	2	0.0524	0.0529	0.0044	0.0029
	3	0.3267	0.1038	0.0000	0.0000
Coho	1	0.0000	0.0000	0.0000	0.0000
Salmon	2	0.0306	0.0820	0.0306	0.0820
	3	0.0000	0.0000	0.0000	0.0000
Rainbow	1	0.7553	0.1382	0.0845	0.0218
Trout	2	0.4408	0.1996	0.0524	0.0312
	3	1.0222	0.1114	0.0800	0.0240
Dolly	1	0.0000	0.0000	0.0000	0.0000
Varden	2	0.0131	0.0075	0.0000	0.0000
	3	0.0356	0.0158	0.0067	0.0039
Arctic	1	0.0423	0.0326	0.0106	0.0067
Grayling	2	0.0524	0.0279	0.0218	0.0147
	3	0.0556	0.0151	0.0089	0.0045
Burbot	1	0.0000	0.0000	0.0000	0.0000
	2	0.0000	0.0000	0.0000	0.0000
	3	0.0133	0.0093	0.0067	0.0035
Northern	1	0.0000	0.0000	0.0000	0.0000
Pike	2	0.0044	0.0036	0.0000	0.0000
	3	0.0000	0.0000	0.0000	0.0000

¹ 1 - 6/8-6/14; 2 - 6/15-9/13; 3 - 9/14-10/30.

² Standard Error.

Table 4. Estimated catch and harvest, by species, for the sport fishery in the lower Naknek River, 1987.

Species	Temporal Component ¹	Catch				Harvest				Percent Harvested
		Number	SE ²	95% CI ³	Rel Pre ⁴	Number	SE ²	95% CI ³	Rel Pre ⁴	
Chinook	1	279	87	108 - 450	61.4%	279	87	108 - 450	61.4%	100.0%
Salmon	2	9,655	991	7,713 - 11,597	20.1%	8,472	854	6,798 - 10,146	19.8%	87.7%
	3	3,545	462	2,639 - 4,451	25.5%	2,290	292	1,717 - 2,863	25.0%	64.6%
	4	771	268	246 - 1,296	68.1%	378	139	106 - 650	72.1%	49.0%
Total		14,250	1,129	12,038 - 16,462	15.5%	11,419	918	9,620 - 13,218	15.8%	80.1%
Coho	1	0	0	0 - 0		0	0	0 - 0		0.0%
Salmon	2	0	0	0 - 0		0	0	0 - 0		0.0%
	3	193	211	0 - 607	214.7%	179	210	0 - 590	229.7%	92.7%
	4	1,906	909	124 - 3,688	93.5%	1,815	869	112 - 3,518	93.8%	95.2%
Total		2,099	933	271 - 3,927	87.1%	1,994	894	242 - 3,746	87.8%	95.0%
Rainbow	1	101	82	0 - 263	160.0%	50	78	0 - 202	304.2%	49.5%
Trout	2	717	143	437 - 997	39.0%	258	71	120 - 396	53.6%	36.0%
	3	117	34	51 - 183	56.6%	83	27	29 - 137	64.9%	70.9%
	4	287	182	0 - 644	124.3%	106	71	0 - 245	131.3%	36.9%
Total		1,222	248	737 - 1,707	39.7%	497	129	243 - 751	51.0%	40.7%
Dolly	1	0	0	0 - 0		0	0	0 - 0		0.0%
Varden	2	39	15	11 - 67	73.0%	0	0	0 - 0		0.0%
	3	6	8	0 - 21	248.9%	0	0	0 - 0		0.0%
	4	15	19	0 - 53	252.3%	0	0	0 - 0		0.0%
Total		60	25	10 - 110	82.8%	0	0	0 - 0		0.0%
Arctic	1	13	7	0 - 27	110.8%	13	7	0 - 27	110.8%	100.0%
Grayling	2	29	31	0 - 89	206.9%	22	28	0 - 78	252.9%	75.9%
	3	0	0	0 - 0		0	0	0 - 0		0.0%
	4	61	102	0 - 261	327.1%	0	0	0 - 0		0.0%
Total		103	107	0 - 312	202.8%	35	29	0 - 93	164.3%	34.0%

¹ 1 - 6/1-6/21; 2 - 6/22-7/21; 3 - 7/22-8/10; 4 - 8/11-9/13.

² Standard Error

³ Confidence interval.

⁴ Relative precision of 95% confidence interval.

Table 5. Estimated catch and harvest, by species, for the sport fishery in the upper Naknek River, 1987.

Species	Temporal Component ¹	Catch				Harvest				Percent Harvested
		Number	SE ²	95 % CI ³	Rel Pre ⁴	Number	SE ²	95 % CI ³	Rel Pre ⁴	
Sockeye	1	0	0	0 - 0		0	0	0 - 0		0.0%
Salmon	2	330	333	0 - 983	197.8%	28	18	0 - 64	128.9%	8.5%
	3	645	225	205 - 1,085	68.2%	0	0	0 - 0		0.0%
Total		975	402	188 - 1,762	80.7%	28	18	0 - 64	128.9%	2.9%
Coho	1	0	0	0 - 0		0	0	0 - 0		0.0%
Salmon	2	193	511	0 - 1,195	519.3%	193	511	0 - 1,195	519.3%	100.0%
	3	0	0	0 - 0		0	0	0 - 0		0.0%
Total		193	511	0 - 1,195	519.3%	193	511	0 - 1,195	519.3%	100.0%
Rainbow	1	1,642	421	817 - 2,467	50.2%	184	57	71 - 297	61.2%	11.2%
Trout	2	2,774	1,304	218 - 5,330	92.1%	330	200	0 - 722	118.7%	11.9%
	3	2,019	373	1,288 - 2,750	36.2%	158	53	55 - 261	65.2%	7.8%
Total		6,435	1,420	3,652 - 9,218	43.3%	672	214	252 - 1,092	62.5%	10.4%
Dolly	1	0	0	0 - 0		0	0	0 - 0		0.0%
Varden	2	82	48	0 - 177	115.5%	0	0	0 - 0		0.0%
	3	70	33	6 - 134	91.1%	13	8	0 - 28	117.8%	18.6%
Total		152	58	38 - 266	75.1%	13	8	0 - 28	117.8%	8.6%
Arctic	1	92	72	0 - 232	152.5%	23	15	0 - 52	126.7%	25.0%
Grayling	2	330	180	0 - 683	107.1%	137	94	0 - 320	133.9%	41.5%
	3	110	34	44 - 176	60.2%	18	9	0 - 36	99.2%	16.4%
Total		532	197	146 - 918	72.5%	178	95	0 - 365	104.9%	33.5%
Burbot	1	0	0	0 - 0		0	0	0 - 0		0.0%
	2	0	0	0 - 0		0	0	0 - 0		0.0%
	3	26	19	0 - 63	140.6%	13	7	0 - 27	106.6%	50.0%
Total		26	19	0 - 63	140.6%	13	7	0 - 27	106.6%	50.0%
Northern	1	0	0	0 - 0		0	0	0 - 0		0.0%
Pike	2	28	23	0 - 73	161.3%	0	0	0 - 0		0.0%
	3	0	0	0 - 0		0	0	0 - 0		0.0%
Total		28	23	0 - 73	161.3%	0	0	0 - 0		0.0%

¹ 1 - 6/8-6/14; 2 - 6/15-9/13; 3 - 9/14-10/30.

² Standard Error.

³ Confidence interval.

⁴ Relative precision of 95% confidence interval.

Table 6. Catch and harvest, by species, for the sport fishery in the lower and upper sections of the Naknek River, 1987.

Location	Effort (Ang-Hrs)	Chinook Salmon		Coho Salmon		Sockeye Salmon		Rainbow Trout		Dolly Varden		Grayling	
		Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch
Lower River													
6/1-9/13	59,932	11,419	14,250	1,994	2,099	0	0	497	1,222	0	60	35	103
Upper River													
6/8-10/30	10,441	0	0	193	193	28	975	672	6,435	13	152	178	532
Both Sections Combined													
	70,373	11,419	14,250	2,187	2,292	28	975	1,169	7,657	13	212	213	635

Table 7. Catch and harvest rates (fish per angler-hour) of chinook salmon by guided and unguided anglers in the sport fishery in the lower Naknek River, 1987.

Temporal Component ¹	No. Interviews		Catch		Harvest	
	Guided	Unguided	Guided	Unguided	Guided	Unguided
1	38	288	0.1070	0.0307	0.1070	0.0307
2	167	628	0.3039	0.2742	0.2764	0.2384
3	114	263	0.3691	0.3186	0.2419	0.2033
4	44	94	0.0430	0.1096	0.0086	0.0646
Season ²	363	1273	0.2692	0.2273	0.2097	0.1812

¹ Period 1 - 6/1-6/21; Period 2 - 6/22-7/21; Period 3 - 7/22-8/10; and Period 4 - 8/11-9/13.

² Seasonal catch and harvest rates between guided and unguided anglers are not significantly different $P = 0.05$.

0.24 fish per hour, respectively, approximately twice that of anglers using artificial lures (Table 8).

Angler Preferences Regarding Regulatory Changes

In anticipation of proposed regulatory changes, anglers in the lower river were asked their preference concerning a variety of regulatory options for the sport fishery for chinook salmon (Table 9). Anglers overwhelmingly agreed that some regulatory changes were needed to prevent overharvest. The most popular options were closures of the spawning grounds and reduction of the bag and possession limits. Of the anglers interviewed, the majority did not desire elimination of bait from the salmon fishery.

Escapement

Approximately 3,500 chinook salmon were observed during aerial surveys (Table 10). The largest number of fish (2,000) were observed in the mainstem Naknek River. Escapement of chinook salmon, expanded for missed sections of the drainage, was estimated to be 6,500 fish. Big Creek and the mainstem of the Naknek River accounted for most (38.5% and 43.1%, respectively) of the expanded escapement estimates.

Size, Sex, and Age Compositions

Approximately 54% of the chinook salmon sampled from the sport harvest (n = 588) were males (Table 11). Age 1.4 fish were most common (53%), followed by age 1.3 (27%) and age 1.2 fish (11%). Mean length and weight of chinook salmon sampled from the sport harvest was 786 mm and 9.5 kg, respectively. The largest chinook salmon sampled weighed 23.2 kg (51.2 lbs). The sex and size compositions of the escapement (Table 12) was similar to that observed in the sport harvest.

Age 5 rainbow trout comprised nearly 40% (Table 13) of the sport harvest (n = 70). Overall average length and weight was 424 mm and 1.1 kg, respectively. The largest rainbow trout sampled was 623 mm (24.5 in) long and weighed 4.5 kg (9.9 lbs).

DISCUSSION

Historical Performance

Sport harvests of chinook salmon in the Naknek River have increased dramatically since 1975 (Figure 2). The estimated 1987 sport harvest of 11,419 chinook salmon was the largest on record (Table 14). Conversely, commercial harvests have steadily declined and subsistence harvests appear to have stabilized (Table 14). This is only the fourth year since 1967 that the sport fishery was the largest harvester of chinook salmon from the Naknek River.

The magnitude of the chinook salmon escapement for the Naknek River during 1987 was below the 20-year average for the drainage (Table 14). Although

Table 8. Catch and harvest rates (fish per angler-hour) of chinook salmon by artificial lures and bait in the lower Naknek River, 1987.

Temporal Component ¹	No. Interviews		Catch		Harvest	
	Artificial	Bait	Artificial	Bait	Artificial	Bait
1	276	36	0.0444	0.0788	0.0444	0.0788
2	275	643	0.2291	0.2827	0.1818	0.2536
3	127	259	0.2656	0.3708	0.1865	0.2327
4	62	27	0.0301	0.2578	0.0172	0.137
Season ²	740	965	0.1518	0.2995	0.1183	0.242

¹ Period 1 - 6/1-6/21; Period 2 - 6/22-7/21; Period 3 - 7/22-8/10; and Period 4 - 8/11-9/13.

² Seasonal catch and harvest rates between artificial lures and bait are significantly different ($P = 0.05$).

Table 9. Responses of anglers regarding proposed regulatory options for the sport fishery for chinook salmon in the Naknek River, 1987.

Management Option	Percent			Sample Size
	Approve	Disapprove	No opinion	
No change in regulations.	23%	73%	4%	243
Spawning ground closures.	78%	16%	6%	243
Reduction in bag limits.	54%	43%	3%	243
Setting of season.	44%	49%	7%	243
Emergency order closures.	42%	54%	4%	243
Eliminate bait.	31%	59%	10%	243

Table 10. Estimates of chinook salmon escapement from aerial surveys in the Naknek River drainage, 1987.

Survey Dates	Location	Chinook Salmon		Percent
		Observed	Expanded ¹	
August 19,21	Big Creek	1,288	2,500	38.5%
August 11	Pauls Creek	27	400	6.2%
August 21	King Salmon Creek	200	800	12.3%
August 19	Naknek River	2,000	2,800	43.1%
	Drainage Total	3,515	6,500	100.0%

¹ Expansion is for missed sections of the river only and does not account for fish which had already spawned or for fish which had yet to enter the spawning grounds.

Table 11. Numbers, mean lengths (mm), and weights (kg) of chinook salmon, by sex and age group, sampled from the sport fishery in the Naknek River, 1987.

	Age Group						Total
	1.1	1.2	1.3	2.2	1.4	1.5	
Male	485	1,131	1,813	18	2,496	180	6,123
Percent	4.25%	9.91%	15.88%	0.16%	21.86%	1.57%	53.62%
Av Length	385	490	741	522	870	879	722
Std Error	4.87	9.48	11.6	0	10.19	58.19	10.92
Sample Size	27	63	101	1	139	10	341
Av Weight	1.0	2.1	7.4	2.1	12.4	13.3	8.2
Std Error	0.04	0.13	0.39	0.00	0.39	1.88	0.32
Sample Size	24	60	88	1	130	10	313
Female	0	90	1,329	0	3,608	269	5,296
Percent	0.00%	0.79%	11.64%	0.00%	31.60%	2.36%	46.38%
Av Length		783	814		875	889	859
Std Error		51.74	8.02		3.92	13.75	3.86
Sample Size		5	74		201	15	295
Av Weight		8.7	9.5		11.6	10.9	11.0
Std Error		1.43	0.30		0.18	0.69	0.17
Sample Size		5	70		74	14	274
Both Sexes	485	1,221	3,142	18	6,104	449	11,419
Percent	4.25%	10.69%	27.52%	0.16%	53.46%	3.93%	100.00%
Av Length	385	512	772	522	873	884	786
Std Error	4.87	13.27	7.98	0	4.76	23.98	6.68
Sample Size	27	68	175	1	340	25	636
Av Weight	1.0	2.6	8.3	2.1	11.9	11.9	9.5
Std Error	0.04	0.27	0.27	0.00	0.19	0.89	0.20
Sample Size	24	65	158	1	315	24	588

Table 12. Sex and age compositions and mean lengths (mm) of chinook salmon sampled from the escapement to Big Creek, King Salmon Creek, and Paul's Creek, 1987.

		Age Group					
		1.1	1.2	1.3	1.4	1.5	Total
<u>Big Creek</u>							
Male	Percent	3.90%	7.51%	27.63%	14.71%	0.60%	54.35%
	Av Length	418	603	802	906	876	776
	Std Error	14.18	25.86	7.86	10.26	27	11.79
	Sample Size	13	25	92	49	2	181
Female	Percent	0.00%	0.90%	21.02%	21.62%	2.10%	45.65%
	Av Length		825	817	861	883	841
	Std Error		29.81	5.57	6.31	15.87	4.43
	Sample Size		3	70	72	7	152
Both Sexes	Percent	3.90%	8.41%	48.65%	36.34%	2.70%	100.00%
	Av Length	418	626	808	879	881	805
	Std Error	14.18	26.69	5.09	5.93	12.97	6.94
	Sample Size	13	28	162	121	9	333
<u>King Salmon Creek</u>							
Males	Percent	6.80%	6.12%	10.20%	19.05%	3.40%	45.58%
	Av Length	381	568	747	885	904	738
	Std Error	20.02	32.61	17.88	13.79	36.52	24.37
	Sample Size	10	9	15	28	5	67
Females	Percent	0.00%	0.00%	4.76%	44.90%	4.08%	54.42%
	Av Length			780	860	868	854
	Std Error			20.87	6.62	21.11	6.5
	Sample Size			7	66	6	80
Both Sexes	Percent	6.80%	6.12%	14.97%	63.95%	7.48%	100.00%
	Av Length	381	568	757	867	884	801
	Std Error	20.02	32.61	14.01	6.28	19.89	12.57
	Sample Size	10	9	22	94	11	147
<u>Paul's Creek</u>							
Male	Percent	11.11%	1.23%	23.46%	14.81%	2.47%	54.32%
	Av Length	401	550	763	861	845	720
	Std Error	23.55		14.11	24.07	128	28.67
	Sample Size	9	1	19	12	2	44
Female	Percent	0.00%	0.00%	16.05%	24.69%	4.94%	45.68%
	Av Length			792	843	865	828
	Std Error			9.35	11.7	22.04	8.58
	Sample Size			13	20	4	37
Both Sexes	Percent	11.11%	1.23%	39.51%	39.51%	7.41%	100.00%
	Av Length	401	550	775	850	858	769
	Std Error	23.55		9.44	11.49	36.11	17.06
	Sample Size	9	1	32	32	6	81

Table 13. Sex and age compositions and mean lengths (mm) and weights (kg) of rainbow trout sampled from the sport harvest in the Naknek River, 1987.

	Age Group							TOTAL
	2	3	4	5	6	7	9	
MALES								
Percent	3.7%	2.5%	12.3%	13.6%	2.5%	2.5%	1.2%	38.3%
Mean Ln	266	274	406	460	469	587	623	426
Std Err	10.35	18.50	19.11	17.93	18.50	23.50		18.14
Sample Size	3	2	10	11	2	2	1	31
Mean Wt	0.2	0.2	0.7	1.0	1.0	2.9	2.7	1.0
Std Err	0.00	0.00	0.13	0.10		0.77		0.15
Sample Size	3	2	10	9	1	2	1	28
FEMALES								
Percent			8.6%	7.4%	4.9%	3.7%		24.7%
Mean Ln			405	486	488	444		452
Std Err			13.52	10.76	19.59	21.15		11.03
Sample Size			7	6	4	3		20
Mean Wt			0.7	1.3	1.4	0.9		1.1
Std Err			0.11	0.04	0.19	0.26		0.09
Sample Size			5	6	3	3		17
UNKNOWN								
Percent	2.5%	3.7%	11.1%	18.5%	1.2%			37.0%
Mean Ln	247	299	400	444	494			405
Std Err	0.50	21.23	10.79	16.24				14.43
Sample Size	2	3	9	15	1			30
Mean Wt	0.1	1.6	1.4	1.1	1.5			1.2
Std Err	0.00	1.45	0.54	0.15				0.23
Sample Size	2	3	7	12	1			25
ALL SAMPLES								
Percent	6.2%	6.2%	32.1%	39.5%	8.6%	6.2%	1.2%	100.0%
Mean Ln	258	289	404	457	483	501	623	424
Std Err	7.36	14.47	8.69	10.14	11.89	37.60		9.29
Sample Size	5	5	26	32	7	5	1	81
Mean Wt	0.2	1.1	0.9	1.1	1.4	1.7	2.7	1.1
Std Err	0.02	0.87	0.18	0.08	0.14	0.57		0.10
Sample Size	5	5	22	27	5	5	1	70

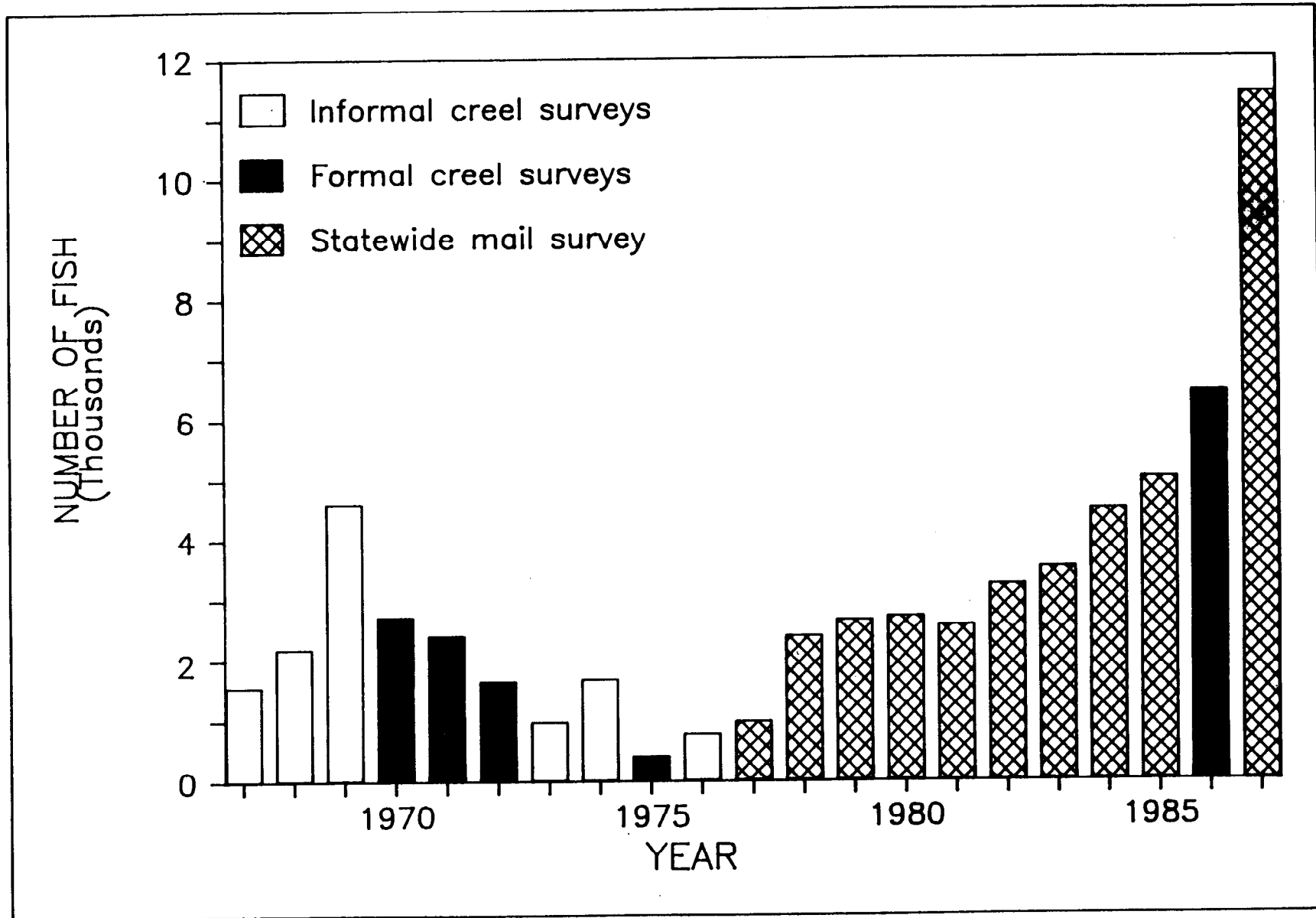


Figure 2. Naknek River chinook salmon sport harvest, 1967 – 1987.

Table 14. Harvests and escapements of chinook salmon returns to the Naknek River, 1967-1987.

Year	Harvest				Escapement Index ⁴	Total Run ⁵	% Exploitation by the Sport Fishery
	Commercial ¹	Subsistence ²	Sport ³	Total			
1967	3,705	500	1,579	5,784	2,218	8,002	20%
1968	6,398	500	2,203	9,101	7,120	16,221	14%
1969	19,016	400	4,631	24,047	8,922	32,969	14%
1970	19,037	300	2,730	22,067	4,361	26,428	10%
1971	10,254	200	2,417	12,871	2,866	15,737	15%
1972	2,262	400	1,668	4,330	2,791	7,121	23%
1973	951	600	1,000	2,551	2,625	5,176	19%
1974	480	1,000	1,700	3,180	2,575	5,755	30%
1975	964	700	427	2,091	3,704	5,795	7%
1976	4,064	900	800	5,764	9,150	14,914	5%
1977	4,373	1,300	1,005	6,678	10,800	17,478	6%
1978	6,930	1,200	2,406	10,536	9,075	19,611	12%
1979	10,415	1,200	2,669	14,284	7,150	21,434	12%
1980	7,517	1,500	2,729	11,746			
1981	11,048	1,000	2,581	14,629	8,920	23,549	11%
1982	12,425	1,100	3,264	16,789	17,000	33,789	10%
1983	9,942	1,000	3,545	14,487	13,400	27,887	13%
1984	9,198	900	4,524	14,622	12,400	27,022	17%
1985	5,891	979	5,038	11,908	4,100	16,008	31%
1986	3,552	1,000	6,462	11,014	8,350	19,364	33%
Mean	7,433	834	2,669	10,936	7,238	18,174	15%
1987	5,000	1,000	11,420	17,420	6,500	23,920	48%

¹ Commercial catches estimated from sales receipts. These catches are composed of mixed stocks, with the actual number of Naknek River origin fish being unknown.

² Subsistence catches estimated from permits.

³ Sport harvest estimated by informal creel survey for 1967, 1968, 1969, 1973, 1974, and 1976. Sport harvest estimated formally for 1970, 1971, 1972, 1975, 1986, and 1987. Sport harvest estimated by statewide survey 1977-1985.

⁴ Escapement estimated by fixed wing aerial surveys. Estimates are believed to be conservative.

⁵ In all years, total run is to be considered a minimum number.

escapement levels appear adequate compared to previous years, rigorous analysis of escapement requirements is not possible with the present data base.

The 1987 harvest of rainbow trout from the Naknek River in 1987 is below the 10-year harvest (Table 15). Creel surveys conducted during the fall (August 15-October 15) fishery in the upper Naknek River (Gwartney 1985) have shown a consistent trend of increasing catches and a decreasing proportion of fish being retained (Table 16). Mean length of fish harvested was the lowest (424 mm) recorded since 1978.

Table 15. Harvests of coho salmon, rainbow trout, and Dolly Varden by the sport fishery in the Naknek River, 1977-1987.

Year	Sport Harvest ¹		
	Coho Salmon	Rainbow Trout	Dolly Varden
1977	297	586	195
1978	646	371	127
1979	300	954	527
1980	818	1,705	1,679
1981	1,156	2,184	1,609
1982	1,676	975	786
1983	1,385	2,398	808
1984	2,332	2,881	2,831
1985	1,281	1,561	416
1986	1,942	2,425	1,506
Mean	1,184	1,604	1,048
1987	2,187	1,167	13

¹ 1977 - 1986 sport harvest data are from ADF&G statewide harvest summary. 1987 data are from a formal creel survey.

Table 16. Effort, harvest, catch, and catch rate statistics for anglers fishing the upper Naknek River during the period 15 August through 15 October, 1978, 1981, 1983, 1984, and 1987. Length statistics of harvested rainbow trout during these years are also presented.

Year	Effort Angler-Hours	Catch	Catch/Hr.	Harvest	Proportion Retained	Mean Length(mm)	Std Err	Sample Size
1978	1,896	847	0.45	248	0.29	484	20.23	55
1981	3,025	4,322	1.43	860	0.20	444	6.16	218
1983	6,755	4,182	0.62	1,452	0.35	430	5.70	135
1984	4,611	3,092	0.67	570	0.18	466	1	1
1987	6,500	6,780	1.04	690	0.10	423	9.29	81

¹ Not available.

LITERATURE CITED

- Alaska Department of Fish and Game. 1987. 1987 Alaska sport fishing regulations summary. Alaska Department of Fish and Game, Juneau, Alaska. 31 pp.
- Burger, C. V. and L. A. Gwartney. 1986. A radio tagging study of Naknek drainage rainbow trout. U.S. Fish and Wildlife Service Final Report. 57 pp.
- Clutter, R. I. and L. E. Whitesel. 1956. Collection and interpretation of sockeye salmon scales. International Pacific Salmon Fishery Commission, Bulletin 9. 159 pp.
- Conover, W. J. 1980. Practical nonparametric statistics. John Wiley and Sons, New York. 493 pp.
- DiConstanzo, C. J. 1956. Creel census techniques and harvest of fishes in Clear Lake, Iowa. Ph.D. Dissertation, Iowa State College, Ames, Iowa. 130 pp.
- Goodman, L. A. 1960. On the exact variance of products. Journal of the American Statistical Association 66:708-713.
- Gwartney, L. A. 1976. Inventory and cataloging of the sport fish and sport fish waters of the Bristol Bay Area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Performance, 1975-1976, Project F-9-8, 17(G-I-E): 87-105.
- _____. 1979. Inventory and cataloging of the sport fish and sport fish waters in the Bristol Bay area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Performance, 1978-1979, Project F-9-11, 20(G-I-E): 1-25.
- _____. 1980. Inventory and cataloging of the sport fish and sport fish waters of the Bristol Bay area. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Performance, 1979-1980, Project F-9-12, 21(G-I-E): 1-20.
- _____. 1985. Naknek drainage rainbow trout study in the Katmai National Park and Preserve. Alaska Department of Fish and Game and National Park Service. Internal publication. 91 pp.
- Jessen, R. J. 1978. Statistical survey techniques. John Wiley and Sons, New York. 520 pp.
- Mills, M. J. 1987. Alaska statewide sport fisheries harvest report. Alaska Department of Fish and Game, Fisheries Data Series Report No.2. 140 pp.
- Minard, R. E. 1987. Effort and catch statistics for the chinook salmon *Oncorhynchus tshawytscha* sport fishery in the lower Naknek River, 1986. Alaska Department of Fish and Game, Fishery Data Series No. 28. 28 pp.

LITERATURE CITED (Continued)

- Neuhold, J. M. and K. H. Lu. 1957. Creel census method. Utah State Department of Fish and Game, Publication 8, Salt Lake City, Utah. 36 pp.
- Schaeffer, R. L., W. Mendenhall, and L. Ott. 1979. Elementary survey sampling. Duxbury Press, North Scituate, Massachusetts. 278 pp.
- Sukhatme, P. V., B. U. Sukhatme, S. Sukhatme, and C. Asok. 1984. Sampling theory of surveys with applications. Iowa State University Press, Ames Iowa. 526 pp.
- Von Geldern, C. E. and P. K. Tomlinson. 1973. On the analysis of angler catch rate data from warmwater reservoirs. California Fish and Game. 59(4):281-292.

APPENDIX TABLES

Appendix Table 1. Angler counts for the sport fishery in the lower Naknek River, 1987.

Date	Wd/We ²	Period ¹		
		A	B	C
6/01	Wd		7	6
6/02	Wd			
6/03	Wd	12	14	
6/04	Wd			
6/05	Wd	3	1	
6/06	We			35
6/07	We		11	0
6/08	Wd			
6/09	Wd			
6/10	Wd			
6/11	Wd		5	15
6/12	Wd			
6/13	We			
6/14	We			
6/15	Wd		23	5
6/16	Wd		27	
6/17	Wd			
6/18	Wd		29	9
6/19	Wd			
6/20	We		25	0
6/21	We			
6/22	Wd			
6/23	Wd			
6/24	Wd		28	22
6/25	Wd	60	69	
6/26	Wd		91	47
6/27	We			
6/28	We			
6/29	Wd	46		
6/30	Wd			
7/01	Wd	112	89	15
7/02	Wd		139	54
7/03	Wd	12	201	
7/04	We	17	186	
7/05	We		95	37

-Continued-

Appendix Table 1. Angler counts for the sport fishery in the lower Naknek River, 1987 (Continued).

Date	Wd/We ²	Period ¹		
		A	B	C
7/06	Wd		143	56
7/07	Wd			
7/08	Wd			
7/09	Wd	110	104	
7/10	Wd	62	153	24
7/11	We		127	84
7/12	We	115	79	4
7/13	Wd			
7/14	Wd		76	54
7/15	Wd			
7/16	Wd	46	86	
7/17	Wd		77	2
7/18	We	22	109	28
7/19	We	37		7
7/20	Wd			
7/21	Wd	67	72	
7/22	Wd	45	57	0
7/23	Wd	4		
7/24	Wd	23	48	
7/25	We		57	32
7/26	We	65	50	
7/27	Wd			
7/28	Wd	64	31	
7/29	Wd		31	8
7/30	Wd	14	34	28
7/31	Wd		25	7
8/01	We	3	65	23
8/02	We			
8/03	Wd			
8/04	Wd			
8/05	Wd	23	24	
8/06	Wd			
8/07	Wd			
8/08	We		65	22
8/09	We	29	53	

-Continued-

Appendix Table 1. Angler counts for the sport fishery in the lower Naknek River, 1987 (Continued).

Date	Wd/We ²	Period ¹		
		A	B	C
8/10	Wd	33	42	
8/11	Wd			
8/12	Wd			
8/13	Wd			
8/14	Wd			
8/15	We		95	30
8/16	We			
8/17	Wd			
8/18	Wd			
8/19	Wd	34	18	
8/20	Wd			
8/21	Wd			
8/22	We			
8/23	We		46	6
8/24	Wd			
8/25	Wd		24	34
8/26	Wd			
8/27	Wd			
8/28	Wd			
8/29	We	25	39	
8/30	We			
8/31	Wd			
9/01	Wd		13	
9/02	Wd	26	11	
9/03	Wd		5	2
9/04	Wd			
9/05	We		16	0
9/06	We			
9/07	Wd		11	0
9/08	Wd			
9/09	Wd			
9/10	Wd	0	0	
9/11	Wd			
9/12	We			
9/13	We		0	

¹ Period A (0600-1159); Period B (1200-1759);
Period C (1800-2400)

² Wd = Weekday; We = Weekend/Holiday.

Appendix Table 2. Angler counts for the sport fishery in the upper Naknek River, 1987.

Date	Wd/We ²	Period ¹		
		A	B	C
6/08	Wd		16	12
6/09	Wd			
6/10	Wd	21	9	
6/11	Wd			
6/12	Wd	9	14	
6/13	We	21	36	
6/14	We			
6/15	Wd			
6/16	Wd			
6/17	Wd		6	6
6/18	Wd			
6/19	Wd			
6/20	We			
6/21	We			
6/22	Wd	6	10	
6/23	Wd		0	2
6/24	Wd			
6/25	Wd			
6/26	Wd			
6/27	We			
6/28	We			
6/29	Wd		0	0
6/30	Wd		6	0
7/01	Wd			
7/02	Wd		4	7
7/03	Wd			
7/04	We			
7/05	We			
7/06	Wd		14	0
7/07	Wd		14	2
7/08	Wd	0		8
7/09	Wd			
7/10	Wd			
7/11	We			
7/12	We			

-Continued-

Appendix Table 2. Angler counts for the sport fishery in the upper Naknek River, 1987 (Continued).

Date	Wd/We ²	Period ¹		
		A	B	C
7/13	Wd			
7/14	Wd			
7/15	Wd			
7/16	Wd		11	5
7/17	Wd	0	0	
7/18	We		2	0
7/19	We			
7/20	Wd			
7/21	Wd	0		
7/22	Wd			
7/23	Wd	0	4	
7/24	Wd			
7/25	We			
7/26	We		32	5
7/27	Wd			
7/28	Wd		11	2
7/29	Wd			
7/30	Wd			
7/31	Wd			
8/01	We			
8/02	We		7	0
8/03	Wd			
8/04	Wd	0	2	
8/05	Wd			
8/06	Wd			
8/07	Wd		0	
8/08	We			
8/09	We			
8/10	Wd			
8/11	Wd			
8/12	Wd	7	9	
8/13	Wd		6	0
8/14	Wd		1	
8/15	We			
8/16	We			

-Continued-

Appendix Table 2. Angler counts for the sport fishery in the upper Naknek River, 1987 (Continued).

Date	Wd/We ²	Period ¹		
		A	B	C
8/17	Wd	5	10	
8/18	Wd	2	15	
8/19	Wd			
8/20	Wd		17	0
8/21	Wd			
8/22	We			
8/23	We			
8/24	Wd			
8/25	Wd			
8/26	Wd	3	15	
8/27	Wd		14	4
8/28	Wd	0	19	
8/29	We			
8/30	We			
8/31	Wd			
9/01	Wd			
9/02	Wd			
9/03	Wd			
9/04	Wd			
9/05	We			
9/06	We		3	2
9/07	Wd	0	7	
9/08	Wd			
9/09	Wd			
9/10	Wd			
9/11	Wd			
9/12	We			
9/13	We			
9/14	Wd	2	4	
9/15	Wd	0	4	
9/16	Wd	2	10	
9/17	Wd			
9/18	Wd			
9/19	We		4	2
9/20	We	2	11	

-Continued-

Appendix Table 2. Angler counts for the sport fishery in the upper Naknek River, 1987 (Continued).

Date	Wd/We ²	Period ¹		
		A	B	C
9/21	Wd		0	0
9/22	Wd			
9/23	Wd		4	6
9/24	Wd	0	4	
9/25	Wd	0	16	
9/26	We			
9/27	We	3	33	
9/28	Wd	6	9	
9/29	Wd		6	0
9/30	Wd			
10/01	Wd			
10/02	Wd		6	0
10/03	We	3	7	
10/04	We		15	
10/05	Wd	3	2	
10/06	Wd	0	0	
10/07	Wd		2	4
10/08	Wd		2	
10/09	Wd			
10/10	We			
10/11	We	3	6	
10/12	Wd	1	11	
10/13	Wd		2	0
10/14	Wd	0	0	
10/15	Wd			
10/16	Wd	3	2	
10/17	We			
10/18	We		13	6
10/19	Wd	0	5	
10/20	Wd	0	0	
10/21	Wd	0	1	
10/22	Wd			
10/23	Wd			
10/24	We		4	0
10/25	We	2	9	

-Continued-

Appendix Table 2. Angler counts for the sport fishery in the upper Naknek River, 1987 (Continued).

Date	Wd/We ²	Period ¹		
		A	B	C
10/26	Wd			0
10/27	Wd			
10/28	Wd		2	
10/29	Wd	0	4	
10/30	Wd	0	6	
10/31	We			
11/01	We			

¹ From 6/8 to 9/13: Period A (0600-1159);
 Period B (1200-1759); Period C (1800-2359).
 From 9/14 to 10/31: Period A (0800-1159);
 Period B (1200-1659); Period C (1700-2000).

² Wd = Weekday; We - Weekend/Holiday.

Appendix Table 3. Summary of daily angler effort and catch rates (CPUE) for chinook and coho salmon, rainbow trout, Dolly Varden, and Arctic grayling from angler interviews in the sport fishery in the lower Naknek River, 1987.

Date	Wd/We ¹	Sample Size	Effort		Chinook			Coho			Rainbow Trout			Dolly Varden			Grayling		
			Mean	SE ²	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE
6/01	Wd	4	1.300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.289	0.376	0.000	0.000	0.000	0.000	0.000	0.000
6/03	Wd	10	3.600	0.650	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6/05	Wd	10	2.800	0.130	0.200	0.133	0.071	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6/06	We	42	3.500	0.340	0.140	0.100	0.041	0.000	0.000	0.000	0.100	0.046	0.027	0.000	0.000	0.000	0.050	0.033	0.014
6/07	We	18	6.000	0.830	0.000	0.000	0.000	0.000	0.000	0.000	0.440	0.202	0.074	0.000	0.000	0.000	0.000	0.000	0.000
6/11	Wd	20	2.000	0.160	0.300	0.147	0.146	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6/15	Wd	56	1.900	0.120	0.110	0.042	0.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6/16	Wd	8	1.300	0.090	0.250	0.164	0.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6/18	Wd	60	3.000	0.230	0.370	0.086	0.121	0.000	0.000	0.000	0.030	0.023	0.011	0.000	0.000	0.000	0.000	0.000	0.000
6/24	Wd	54	3.600	0.310	1.410	0.216	0.396	0.000	0.000	0.000	0.330	0.112	0.094	0.000	0.000	0.000	0.000	0.000	0.000
6/25	Wd	62	3.100	0.170	0.900	0.127	0.293	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6/26	Wd	54	3.500	0.200	1.000	0.124	0.286	0.000	0.000	0.000	0.150	0.081	0.042	0.000	0.000	0.000	0.000	0.000	0.000
6/29	Wd	9	0.800	0.220	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/01	Wd	69	4.200	0.320	1.710	0.193	0.406	0.000	0.000	0.000	0.100	0.047	0.024	0.000	0.000	0.000	0.000	0.000	0.000
7/02	Wd	38	3.800	0.240	1.890	0.446	0.498	0.000	0.000	0.000	0.110	0.063	0.028	0.000	0.000	0.000	0.000	0.000	0.000
7/03	We	14	2.100	0.290	0.930	0.339	0.441	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/04	We	17	2.400	0.190	0.820	0.214	0.344	0.000	0.000	0.000	0.060	0.059	0.025	0.000	0.000	0.000	0.060	0.059	0.025
7/05	We	50	4.800	0.340	0.660	0.109	0.138	0.000	0.000	0.000	0.160	0.072	0.033	0.000	0.000	0.000	0.040	0.028	0.008
7/06	Wd	40	4.100	0.350	0.680	0.140	0.165	0.000	0.000	0.000	0.150	0.084	0.037	0.000	0.000	0.000	0.000	0.000	0.000
7/09	Wd	35	3.200	0.350	0.830	0.171	0.262	0.000	0.000	0.000	0.030	0.029	0.009	0.000	0.000	0.000	0.000	0.000	0.000
7/10	Wd	101	3.900	0.250	0.600	0.083	0.156	0.000	0.000	0.000	0.080	0.062	0.020	0.040	0.024	0.010	0.000	0.000	0.000
7/11	We	62	5.100	0.350	0.730	0.124	0.142	0.000	0.000	0.000	0.020	0.016	0.003	0.000	0.000	0.000	0.000	0.000	0.000
7/12	We	81	4.500	0.330	1.300	0.125	0.289	0.000	0.000	0.000	0.020	0.025	0.006	0.000	0.000	0.000	0.000	0.000	0.000
7/14	Wd	30	4.500	0.440	1.270	0.179	0.279	0.000	0.000	0.000	0.070	0.046	0.015	0.000	0.000	0.000	0.000	0.000	0.000
7/16	Wd	38	2.700	0.190	0.470	0.118	0.174	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/17	Wd	32	5.300	0.470	1.220	0.209	0.231	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/18	We	88	3.900	0.250	1.250	0.134	0.323	0.000	0.000	0.000	0.050	0.022	0.012	0.000	0.000	0.000	0.000	0.000	0.000
7/19	We	31	3.700	0.400	1.130	0.195	0.306	0.000	0.000	0.000	0.030	0.032	0.009	0.000	0.000	0.000	0.000	0.000	0.000

-Continued-

Appendix Table 3. Summary of daily angler effort and catch rates (CPUE) for chinook and coho salmon, rainbow trout, Dolly Varden, and Arctic grayling from angler interviews in the sport fishery in the lower Naknek River, 1987 (Continued).

Date	Wd/We ¹	Sample Size	Effort		Chinook			Coho			Rainbow Trout			Dolly Varden			Grayling		
			Mean	SE ²	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE
7/21	Wd	19	3.900	0.340	1.530	0.234	0.392	0.000	0.000	0.000	0.050	0.053	0.014	0.000	0.000	0.000	0.000	0.000	0.000
7/22	Wd	63	4.100	0.260	1.270	0.184	0.312	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/23	Wd	16	3.200	0.180	1.690	0.285	0.535	0.000	0.000	0.000	0.060	0.063	0.020	0.000	0.000	0.000	0.000	0.000	0.000
7/24	Wd	20	2.800	0.270	0.700	0.164	0.250	0.000	0.000	0.000	0.100	0.069	0.036	0.000	0.000	0.000	0.000	0.000	0.000
7/25	We	32	4.800	0.500	1.190	0.226	0.248	0.000	0.000	0.000	0.060	0.043	0.013	0.000	0.000	0.000	0.000	0.000	0.000
7/26	We	33	3.700	0.340	1.000	0.222	0.269	0.000	0.000	0.000	0.060	0.042	0.016	0.000	0.000	0.000	0.000	0.000	0.000
7/28	Wd	31	3.700	0.210	1.550	0.185	0.414	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/29	Wd	34	3.200	0.370	0.740	0.181	0.231	0.000	0.000	0.000	0.030	0.029	0.009	0.000	0.000	0.000	0.000	0.000	0.000
7/30	Wd	35	3.100	0.360	1.490	0.302	0.472	0.030	0.029	0.009	0.090	0.086	0.027	0.000	0.000	0.000	0.000	0.000	0.000
7/31	Wd	31	4.200	0.590	0.900	0.193	0.217	0.000	0.000	0.000	0.100	0.054	0.023	0.000	0.000	0.000	0.000	0.000	0.000
8/01	We	41	3.900	0.220	1.660	0.283	0.428	0.000	0.000	0.000	0.020	0.024	0.006	0.000	0.000	0.000	0.000	0.000	0.000
8/05	Wd	12	5.200	0.100	2.330	0.310	0.449	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/08	We	26	5.100	0.390	2.120	0.678	0.417	0.420	0.185	0.083	0.080	0.053	0.015	0.040	0.038	0.008	0.000	0.000	0.000
8/09	We	5	4.000	0.680	0.400	0.400	0.100	1.000	1.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/10	Wd	24	3.300	0.250	0.670	0.155	0.203	0.460	0.190	0.140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/15	We	41	4.400	0.210	1.000	0.221	0.225	0.660	0.177	0.148	0.020	0.024	0.005	0.000	0.000	0.000	0.000	0.000	0.000
8/19	Wd	15	2.900	0.200	0.330	0.232	0.113	0.470	0.215	0.158	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/23	We	13	3.500	0.350	0.000	0.000	0.000	0.230	0.122	0.067	0.380	0.213	0.111	0.000	0.000	0.000	0.000	0.000	0.000
8/25	Wd	7	6.900	1.030	0.000	0.000	0.000	3.140	0.986	0.455	0.290	0.184	0.041	0.000	0.000	0.000	0.570	0.429	0.083
8/29	We	11	5.700	0.430	0.000	0.000	0.000	0.730	0.384	0.127	0.090	0.091	0.016	0.000	0.000	0.000	0.000	0.000	0.000
9/01	Wd	10	6.300	0.650	0.300	0.213	0.048	0.200	0.133	0.032	1.000	0.537	0.159	0.100	0.100	0.016	0.000	0.000	0.000
9/02	Wd	14	3.600	0.450	0.070	0.071	0.020	1.360	0.427	0.376	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9/03	Wd	2	6.600	0.000	0.000	0.000	0.000	5.000	0.000	0.760	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9/05	We	12	3.900	0.700	0.000	0.000	0.000	2.330	0.689	0.597	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9/07	We	14	3.300	0.400	0.070	0.071	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9/13	We	4	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

1/ Wd = Weekday; We = Weekend/Holiday

Appendix Table 4. Summary of daily angler effort and harvest rates (CPUE) for chinook and coho salmon, rainbow trout, Dolly Varden, and Arctic grayling from angler interviews in the sport fishery in the lower Naknek River, 1987.

Date	Wd/We ¹	Sample Size	Effort		Chinook			Coho			Rainbow Trout			Dolly Varden			Grayling		
			Mean	SE ²	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE
6/01	Wd	4	1.300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.289	0.376	0.000	0.000	0.000	0.000	0.000	0.000
6/03	Wd	10	3.600	0.650	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6/05	Wd	10	2.800	0.130	0.200	0.133	0.071	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6/06	We	42	3.500	0.340	0.140	0.100	0.041	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.033	0.014
6/07	We	18	6.000	0.830	0.000	0.000	0.000	0.000	0.000	0.000	0.330	0.162	0.056	0.000	0.000	0.000	0.000	0.000	0.000
6/11	Wd	20	2.000	0.160	0.300	0.147	0.146	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6/15	Wd	56	1.900	0.120	0.110	0.042	0.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6/16	Wd	8	1.300	0.090	0.250	0.164	0.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6/18	Wd	60	3.000	0.230	0.370	0.086	0.121	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6/24	Wd	54	3.600	0.310	1.260	0.193	0.354	0.000	0.000	0.000	0.070	0.036	0.021	0.000	0.000	0.000	0.000	0.000	0.000
6/25	Wd	62	3.100	0.170	0.710	0.109	0.230	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6/26	Wd	54	3.500	0.200	0.930	0.118	0.265	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6/29	Wd	9	0.800	0.220	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/01	Wd	69	4.200	0.320	1.330	0.146	0.316	0.000	0.000	0.000	0.070	0.038	0.017	0.000	0.000	0.000	0.000	0.000	0.000
7/02	Wd	38	3.800	0.240	1.240	0.183	0.325	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/03	We	14	2.100	0.290	0.930	0.339	0.441	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/04	We	17	2.400	0.190	0.710	0.223	0.294	0.000	0.000	0.000	0.060	0.059	0.025	0.000	0.000	0.000	0.060	0.059	0.025
7/05	We	50	4.800	0.340	0.660	0.109	0.138	0.000	0.000	0.000	0.020	0.020	0.004	0.000	0.000	0.000	0.020	0.020	0.004
7/06	Wd	40	4.100	0.350	0.530	0.124	0.128	0.000	0.000	0.000	0.150	0.084	0.037	0.000	0.000	0.000	0.000	0.000	0.000
7/09	Wd	35	3.200	0.350	0.800	0.168	0.253	0.000	0.000	0.000	0.030	0.029	0.009	0.000	0.000	0.000	0.000	0.000	0.000
7/10	Wd	101	3.900	0.250	0.530	0.078	0.138	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/11	We	62	5.100	0.350	0.730	0.124	0.142	0.000	0.000	0.000	0.020	0.016	0.003	0.000	0.000	0.000	0.000	0.000	0.000
7/12	We	81	4.500	0.330	1.260	0.112	0.281	0.000	0.000	0.000	0.020	0.025	0.006	0.000	0.000	0.000	0.000	0.000	0.000
7/14	Wd	30	4.500	0.440	1.270	0.179	0.279	0.000	0.000	0.000	0.030	0.033	0.007	0.000	0.000	0.000	0.000	0.000	0.000
7/16	Wd	38	2.700	0.190	0.470	0.118	0.174	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/17	Wd	32	5.300	0.470	1.160	0.206	0.219	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/18	We	88	3.900	0.250	1.050	0.102	0.270	0.000	0.000	0.000	0.030	0.019	0.009	0.000	0.000	0.000	0.000	0.000	0.000
7/19	We	31	3.700	0.400	1.130	0.195	0.306	0.000	0.000	0.000	0.030	0.032	0.009	0.000	0.000	0.000	0.000	0.000	0.000

-Continued-

Appendix Table 4. Summary of daily angler effort and harvest rates (CPUE) for chinook and coho salmon, rainbow trout, Dolly Varden, and Arctic grayling from angler interviews in the sport fishery in the lower Naknek River, 1987 (Continued).

Date	Wd/We ¹	Sample Size	Effort		Chinook			Coho			Rainbow Trout			Dolly Varden			Grayling		
			Mean	SE ²	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE
7/21	Wd	19	3.900	0.340	1.260	0.200	0.324	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/22	Wd	63	4.100	0.260	1.060	0.139	0.261	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/23	Wd	16	3.200	0.180	1.130	0.202	0.356	0.000	0.000	0.000	0.060	0.063	0.020	0.000	0.000	0.000	0.000	0.000	0.000
7/24	Wd	20	2.800	0.270	0.650	0.167	0.232	0.000	0.000	0.000	0.100	0.069	0.036	0.000	0.000	0.000	0.000	0.000	0.000
7/25	We	32	4.800	0.500	0.720	0.157	0.150	0.000	0.000	0.000	0.030	0.031	0.007	0.000	0.000	0.000	0.000	0.000	0.000
7/26	We	33	3.700	0.340	0.580	0.115	0.155	0.000	0.000	0.000	0.060	0.042	0.016	0.000	0.000	0.000	0.000	0.000	0.000
7/28	Wd	31	3.700	0.210	1.130	0.152	0.302	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/29	Wd	34	3.200	0.370	0.500	0.135	0.157	0.000	0.000	0.000	0.030	0.029	0.009	0.000	0.000	0.000	0.000	0.000	0.000
7/30	Wd	35	3.100	0.360	0.800	0.135	0.254	0.030	0.029	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/31	Wd	31	4.200	0.590	0.680	0.170	0.163	0.000	0.000	0.000	0.100	0.054	0.023	0.000	0.000	0.000	0.000	0.000	0.000
8/01	We	41	3.900	0.220	1.100	0.147	0.283	0.000	0.000	0.000	0.020	0.024	0.006	0.000	0.000	0.000	0.000	0.000	0.000
8/05	Wd	12	5.200	0.100	1.580	0.229	0.305	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/08	We	26	5.100	0.390	0.620	0.158	0.121	0.350	0.175	0.068	0.040	0.038	0.008	0.000	0.000	0.000	0.000	0.000	0.000
8/09	We	5	4.000	0.680	0.400	0.400	0.100	1.000	1.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/10	Wd	24	3.300	0.250	0.380	0.118	0.114	0.460	0.190	0.140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/15	We	41	4.400	0.210	0.540	0.131	0.121	0.660	0.177	0.148	0.020	0.024	0.005	0.000	0.000	0.000	0.000	0.000	0.000
8/19	Wd	15	2.900	0.200	0.130	0.133	0.045	0.400	0.190	0.136	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/23	We	13	3.500	0.350	0.000	0.000	0.000	0.230	0.122	0.067	0.380	0.213	0.111	0.000	0.000	0.000	0.000	0.000	0.000
8/25	Wd	7	6.900	1.030	0.000	0.000	0.000	2.430	0.571	0.352	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/29	We	11	5.700	0.430	0.000	0.000	0.000	0.730	0.384	0.127	0.090	0.091	0.016	0.000	0.000	0.000	0.000	0.000	0.000
9/01	Wd	10	6.300	0.650	0.000	0.000	0.000	0.200	0.133	0.032	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9/02	Wd	14	3.600	0.450	0.070	0.071	0.020	1.360	0.427	0.376	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9/03	Wd	2	6.600	0.000	0.000	0.000	0.000	5.000	0.000	0.760	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9/05	We	12	3.900	0.700	0.000	0.000	0.000	2.330	0.689	0.597	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9/07	We	14	3.300	0.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9/13	We	4	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

¹ Wd = Weekday; We = Weekend/Holiday.

² Standard Error.

Appendix Table 5. Summary of daily angler effort and catch rates (CPUE) for sockeye and coho salmon, rainbow trout, Dolly Varden, and Arctic grayling from angler interviews in the sport fishery in the upper Naknek River, 1987.

Date	Wd/We ¹	Sample Size	Effort		Sockeye			Coho			Rainbow Trout			Dolly Varden			Grayling		
			Mean	SE ²	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE
6/08	Wd	40	4.200	0.240	0.000	0.000	0.000	0.000	0.000	0.000	2.500	0.457	0.593	0.000	0.000	0.000	0.000	0.000	0.000
6/10	Wd	18	2.300	0.250	0.000	0.000	0.000	0.000	0.000	0.000	1.330	0.498	0.585	0.000	0.000	0.000	0.440	0.232	0.195
6/12	Wd	6	5.000	1.260	0.000	0.000	0.000	0.000	0.000	0.000	5.670	1.282	1.133	0.000	0.000	0.000	0.670	0.211	0.133
6/13	We	32	4.300	0.480	0.000	0.000	0.000	0.000	0.000	0.000	4.000	0.710	0.920	0.000	0.000	0.000	0.130	0.087	0.029
6/17	Wd	14	1.000	0.330	0.000	0.000	0.000	0.000	0.000	0.000	0.290	0.125	0.285	0.000	0.000	0.000	0.000	0.000	0.000
6/20	We	16	0.800	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.130	0.085	0.154	0.000	0.000	0.000	0.000	0.000	0.000
6/23	Wd	2	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/02	Wd	2	0.400	0.313	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/06	Wd	10	1.800	0.313	0.100	0.111	0.055	0.000	0.000	0.000	0.100	0.479	0.055	0.000	0.000	0.000	0.000	0.000	0.000
7/07	Wd	7	0.900	0.313	0.140	0.111	0.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/16	Wd	3	2.300	0.313	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.140	0.016	0.032	0.000	0.000	0.000
7/17	Wd	7	4.400	0.313	0.000	0.000	0.000	0.000	0.000	0.000	4.290	0.479	0.965	0.000	0.000	0.000	1.140	0.068	0.257
7/23	Wd	3	1.000	0.313	0.000	0.000	0.000	0.000	0.000	0.000	0.330	0.479	0.333	0.000	0.000	0.000	0.000	0.000	0.000
7/26	We	17	2.900	0.313	0.000	0.000	0.000	0.000	0.000	0.000	0.410	0.479	0.141	0.250	0.016	0.163	0.000	0.000	0.000
7/28	Wd	8	1.500	0.313	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/07	Wd	8	3.900	0.313	0.380	0.111	0.096	0.000	0.000	0.000	1.880	0.479	0.479	0.000	0.000	0.000	0.250	0.068	0.064
8/13	Wd	2	0.300	0.313	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/14	Wd	3	3.400	0.313	0.330	0.111	0.097	0.330	0.170	0.097	2.000	0.479	0.585	0.000	0.000	0.000	0.000	0.000	0.000
8/20	Wd	2	3.500	0.313	0.000	0.000	0.000	3.000	0.170	0.857	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/27	Wd	3	4.200	0.313	2.000	0.111	0.474	0.000	0.000	0.000	1.670	0.479	0.395	0.000	0.000	0.000	0.000	0.000	0.000
9/06	We	4	2.500	0.313	0.000	0.000	0.000	0.000	0.000	0.000	7.500	0.479	2.950	0.000	0.000	0.000	0.500	0.068	0.197
9/14	Wd	3	2.500	1.000	1.670	0.882	0.667	0.000	0.000	0.000	1.670	1.202	0.667	0.000	0.000	0.000	0.000	0.000	0.000
9/16	Wd	5	4.800	0.220	2.000	0.632	0.418	0.000	0.000	0.000	2.400	0.872	0.502	0.200	0.200	0.042	0.000	0.000	0.000
9/19	We	3	3.700	0.830	3.330	1.667	0.909	0.000	0.000	0.000	4.000	1.155	1.091	0.000	0.000	0.000	0.000	0.000	0.000
9/23	Wd	9	3.100	0.640	1.670	0.645	0.529	0.000	0.000	0.000	4.560	1.538	1.447	0.000	0.000	0.000	0.110	0.111	0.035
9/24	Wd	2	3.500	0.000	2.500	2.500	0.714	0.000	0.000	0.000	5.500	0.500	1.571	0.000	0.000	0.000	0.000	0.000	0.000
9/25	Wd	6	3.500	0.320	5.500	2.062	1.571	0.000	0.000	0.000	8.500	1.668	2.429	0.000	0.000	0.000	0.000	0.000	0.000
9/27	We	10	2.700	0.270	0.900	0.379	0.337	0.000	0.000	0.000	3.600	1.416	1.349	0.000	0.000	0.000	0.000	0.000	0.000
9/28	Wd	3	4.700	0.950	0.330	0.333	0.071	0.000	0.000	0.000	6.670	0.882	1.411	1.000	1.000	0.212	0.000	0.000	0.000
9/29	Wd	3	1.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000	0.330	0.333	0.333	0.000	0.000	0.000	0.000	0.000	0.000

-Continued-

Appendix Table 5. Summary of daily angler effort and catch rates (CPUE) for sockeye and coho salmon, rainbow trout, Dolly Varden, and Arctic grayling from angler interviews in the sport fishery in the upper Naknek River, 1987 (Continued).

Date	Wd/We ¹	Sample Size	Effort		Sockeye			Coho			Rainbow Trout			Dolly Varden			Grayling		
			Mean	SE ²	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE
10/02	Wd	8	2.400	0.410	6.250	3.052	2.564	0.000	0.000	0.000	5.000	1.180	2.051	0.130	0.125	0.051	0.000	0.000	0.000
10/03	We	4	2.800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.000	0.577	0.727	0.250	0.250	0.091	1.000	0.408	0.364
10/04	We	16	3.700	0.400	0.380	0.202	0.101	0.000	0.000	0.000	3.130	1.231	0.845	0.380	0.180	0.101	0.500	0.500	0.135
10/05	Wd	7	2.000	0.270	0.000	0.000	0.000	0.000	0.000	0.000	0.140	0.143	0.072	0.000	0.000	0.000	0.000	0.000	0.000
10/07	Wd	3	4.700	0.580	0.000	0.000	0.000	0.000	0.000	0.000	0.670	0.333	0.143	0.000	0.000	0.000	0.000	0.000	0.000
10/08	Wd	4	2.900	0.090	0.000	0.000	0.000	0.000	0.000	0.000	3.000	1.155	1.051	0.000	0.000	0.000	0.000	0.000	0.000
10/11	We	7	2.800	0.180	0.000	0.000	0.000	0.000	0.000	0.000	4.860	1.654	1.766	0.140	0.143	0.052	0.140	0.143	0.052
10/12	Wd	8	2.500	0.550	0.000	0.000	0.000	0.000	0.000	0.000	2.500	1.637	1.013	0.000	0.000	0.000	0.130	0.125	0.051
10/16	Wd	9	2.700	0.520	0.000	0.000	0.000	0.000	0.000	0.000	4.110	1.687	1.500	0.000	0.000	0.000	0.000	0.000	0.000
10/18	We	16	3.600	0.360	0.000	0.000	0.000	0.000	0.000	0.000	2.880	0.688	0.807	0.060	0.063	0.018	0.250	0.144	0.070
10/24	We	7	3.200	0.750	0.000	0.000	0.000	0.000	0.000	0.000	1.430	0.528	0.443	0.000	0.000	0.000	0.430	0.297	0.133
10/25	We	9	2.900	0.540	0.000	0.000	0.000	0.000	0.000	0.000	1.110	0.484	0.381	0.000	0.000	0.000	0.330	0.333	0.114
10/28	Wd	5	1.800	0.120	0.000	0.000	0.000	0.000	0.000	0.000	0.200	0.200	0.111	0.000	0.000	0.000	0.000	0.000	0.000

¹ Wd = Weekday; We = Weekend/Holiday.

² Standard Error.

Appendix Table 6. Summary of daily angler effort and harvest rates (CPUE) for sockeye and coho salmon, rainbow trout, Dolly Varden, and Arctic grayling from angler interviews in the sport fishery in the upper Naknek River, 1987.

Date	Wd/We ¹	Sample Size	Effort		Sockeye			Coho			Rainbow Trout			Dolly Varden			Grayling		
			Mean	SE ²	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE
6/08	Wd	40	4.200	0.240	0.000	0.000	0.000	0.000	0.000	0.000	0.400	0.106	0.095	0.000	0.000	0.000	0.000	0.000	0.000
6/10	Wd	18	2.300	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.330	0.162	0.146	0.000	0.000	0.000	0.000	0.000	0.000
6/12	Wd	6	5.000	1.260	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6/13	We	32	4.300	0.480	0.000	0.000	0.000	0.000	0.000	0.000	0.310	0.122	0.072	0.000	0.000	0.000	0.130	0.087	0.029
6/17	Wd	14	1.000	0.330	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6/20	We	16	0.800	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.130	0.085	0.154	0.000	0.000	0.000	0.000	0.000	0.000
6/23	Wd	2	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/02	Wd	2	0.400	0.313	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/06	Wd	10	1.800	0.313	0.100	0.006	0.055	0.000	0.000	0.000	0.100	0.067	0.055	0.000	0.000	0.000	0.000	0.000	0.000
7/07	Wd	7	0.900	0.313	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/16	Wd	3	2.300	0.313	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/17	Wd	7	4.400	0.313	0.000	0.000	0.000	0.000	0.000	0.000	0.290	0.067	0.064	0.000	0.000	0.000	0.140	0.032	0.032
7/23	Wd	3	1.000	0.313	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/26	We	17	2.900	0.313	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7/28	Wd	8	1.500	0.313	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/07	Wd	8	3.900	0.313	0.000	0.000	0.000	0.000	0.000	0.000	0.130	0.067	0.032	0.000	0.000	0.000	0.250	0.032	0.064
8/13	Wd	2	0.300	0.313	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/14	Wd	3	3.400	0.313	0.000	0.000	0.000	0.330	0.170	0.097	0.670	0.067	0.195	0.000	0.000	0.000	0.000	0.000	0.000
8/20	Wd	2	3.500	0.313	0.000	0.000	0.000	3.000	0.170	0.857	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8/27	Wd	3	4.200	0.313	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.067	0.237	0.000	0.000	0.000	0.000	0.000	0.000
9/06	We	4	2.500	0.313	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.067	0.098	0.000	0.000	0.000	0.500	0.032	0.197
9/14	Wd	3	2.500	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.330	0.333	0.133	0.000	0.000	0.000	0.000	0.000	0.000
9/16	Wd	5	4.800	0.220	0.000	0.000	0.000	0.000	0.000	0.000	0.200	0.200	0.042	0.000	0.000	0.000	0.000	0.000	0.000
9/19	We	3	3.700	0.830	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9/23	Wd	9	3.100	0.640	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9/24	Wd	2	3.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.000	0.000	0.571	0.000	0.000	0.000	0.000	0.000	0.000
9/25	Wd	6	3.500	0.320	0.000	0.000	0.000	0.000	0.000	0.000	0.670	0.422	0.190	0.000	0.000	0.000	0.000	0.000	0.000
9/27	We	10	2.700	0.270	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9/28	Wd	3	4.700	0.950	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9/29	Wd	3	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.330	0.333	0.333	0.000	0.000	0.000	0.000	0.000	0.000

-Continued-

Appendix Table 6. Summary of daily angler effort and harvest rates (CPUE) for sockeye and coho salmon, rainbow trout, Dolly Varden, and Arctic grayling from angler interviews in the sport fishery in the upper Naknek River, 1987 (Continued).

Date	Wd/We ¹	Sample Size	Effort		Sockeye			Coho			Rainbow Trout			Dolly Varden			Grayling		
			Mean	SE ²	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE	Mean	SE ²	CPUE
10/02	Wd	8	2.400	0.410	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.250	0.103	0.000	0.000	0.000	0.000	0.000	0.000
10/03	We	4	2.800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.250	0.091	0.250	0.250	0.091
10/04	We	16	3.700	0.400	0.000	0.000	0.000	0.000	0.000	0.000	0.380	0.202	0.101	0.060	0.063	0.017	0.130	0.125	0.034
10/05	Wd	7	2.000	0.270	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10/07	Wd	3	4.700	0.580	0.000	0.000	0.000	0.000	0.000	0.000	0.330	0.333	0.071	0.000	0.000	0.000	0.000	0.000	0.000
10/08	Wd	4	2.900	0.090	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.289	0.175	0.000	0.000	0.000	0.000	0.000	0.000
10/11	We	7	2.800	0.180	0.000	0.000	0.000	0.000	0.000	0.000	0.430	0.202	0.156	0.000	0.000	0.000	0.000	0.000	0.000
10/12	Wd	8	2.500	0.550	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.130	0.125	0.051
10/16	Wd	9	2.700	0.520	0.000	0.000	0.000	0.000	0.000	0.000	0.330	0.236	0.122	0.000	0.000	0.000	0.000	0.000	0.000
10/18	We	16	3.600	0.360	0.000	0.000	0.000	0.000	0.000	0.000	0.310	0.151	0.088	0.060	0.063	0.018	0.000	0.000	0.000
10/24	We	7	3.200	0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.140	0.143	0.044	0.000	0.000	0.000	0.000	0.000	0.000
10/25	We	9	2.900	0.540	0.000	0.000	0.000	0.000	0.000	0.000	0.220	0.147	0.076	0.000	0.000	0.000	0.000	0.000	0.000
10/28	Wd	5	1.800	0.120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

¹ Wd = Weekday; We = Weekend/Holiday.

² Standard Error.

